

Conservation Strategy and Basin-Wide Feasibility Studies Technical Workshop: “Getting to Measurable Objectives” Workshop Summary

**Thursday, May 2, 2013
9:00 a.m. to 12:30 p.m.**

**City of West Sacramento City Hall
1110 West Capitol Avenue
West Sacramento, CA 95691**

Workshop Overview and Participants

The California Department of Water Resources (DWR) held a technical workshop on Thursday, May 2, 2013 that focused on the approach for developing measurable objectives as part of the Basin-Wide Feasibility Studies (BWFS) and Central Valley Flood System Conservation Strategy (CS). These objectives relate directly to the goals identified in the 2012 Central Valley Flood Protection Plan (CVFPP).

The stated goals of the workshop were to:

1. Describe the process by which integrated BWFS and Conservation Strategy measurable objectives are being developed.
2. Provide an overview of the draft objective topics and potential metrics, and receive public input. Note: workshop participants were also provided with an additional week to provide comments on the draft objective topics and potential metrics.
3. Provide an overview of the approach for developing detailed measurable objectives and receive public input.

During the technical workshop, DWR provided an overview on the process for developing measurable objectives, and provided a status update on their development. Workshop participants were provided with an opportunity to ask clarifying questions. Next, in a “Gallery Walk” activity, workshop participants provided technical input on a suite of draft objective topics and potential metrics that could be used to measure progress on the objectives. Finally, DWR described next steps in further articulating measurable objectives for the BWFS and CS.

The workshop agenda can be found in Appendix A.

Over 70 members of the public participated in the workshop, in addition to DWR staff and supporting consultants. A full list of participants is included in Appendix B. A wide array of stakeholder interest areas were represented including local flood agencies, landowners, environmental interests, participants in the regional flood management planning (RFMP) processes,

and state and federal agencies. Central Valley Flood Protection Board members in attendance included Joe Countryman, Jane Dolan, Bill Edgar, Clyde McDonald, and Emma Suarez.

This document summarizes the presentations made by DWR staff, as well as clarifying questions received and responses provided. It also summarizes input received from the public on the draft objective topics and potential metrics during the Gallery Walk activity. A full listing of all of the comments received during the Gallery Walk activity can be found in Appendix C. Additional comments submitted following the workshop are included in Appendix D.

Background Presentations – The Role of Objectives and Metrics

Joe Bartlett from DWR's Central Valley Flood Planning Office (CVFPO) provided an overview of the BWFS and Conservation Strategy development processes and schedule, and the focus of the workshop. He then described the role of objectives and metrics in BWFS and Conservation Strategy development. He described objectives as operating at a more detailed level than program goals and as serving to define what is trying to be accomplished. Joe also explained that metrics will be used to compare the accomplishments of different options for implementing the State Systemwide Investment Approach (SSIA). Joe stated that metrics will help the State identify options that are most effective and efficient and recommend specific features of the SSIA for implementation.

Joe noted that draft objective topics and potential metrics for the Conservation Strategy and BWFS had been developed by DWR based on public input provided during development of the 2012 CVFPP and subsequent technical analyses. Workshop participants were provided with the draft set of objective topics and potential metrics two weeks in advance of the workshop in the form of a "workbook."

The workbook and the full workshop PowerPoint presentation are available on the CVFMP website at <http://www.water.ca.gov/cvfmp/meetings/>.

Summary of Workshop Clarifying Questions, Comments and Responses

At designated points in the overview presentation, workshop participants were provided with the opportunity to ask clarifying questions. A recap of key questions asked by workshop participants, and the responses provided by DWR staff, is below.

Question: How and when will the RFMPs be integrated into the development of the BWFS and Conservation Strategy?

Answer: RFMP input and engagement are intended to be continuous and fluid throughout the CVFPP implementation process. Both the regions and DWR are in the early stages of their respective processes. The implementation process will be iterative. Information sharing and collaboration will be vital throughout the process. Entities involved will be flexible and adjust their approach as the processes continue to make them as effective and efficient as possible. Communication and coordination has already begun between DWR and the RFMP processes; FESSRO and CVFPO will have representatives for each of the six regions so that coordination is integrated into the planning process.

Q: How will the metrics and objectives be integrated with the BWFS, and how will the metrics inform the BWFS?

A: The 2012 CVFPP implementation process will include physical improvements which are part of the goal of the BWFS. The objectives are not necessarily implementation objectives. The metrics will help prioritize actions, and they could inform funding decisions since they will help address the value of projects and actions to taxpayers.

Q: Regarding the “Objectives lead to a broad range of actions” graphic in the presentation, could more explanation be provided on “segmenting the floodplains”?

A: Segmenting floodplains with infrastructure was one potential hypothetical action among a wide range of potential solutions that will likely vary among different regions. The slide was not calling out a specific area.

Several other questions and comments focused on the importance of coordinating with the agriculture industry and landowners for improved O&M projects as well as improving permitting efficiency. DWR staff responded that it is continuing to review permitting processes and will provide feedback on how permitting will be conducted for actions that are within both local jurisdiction and the BWFS and Conservation Strategy. Other questions pertained to the potential metrics, how they inform the BWFS, and if they will assist in prioritizing actions. DWR staff stated that the metrics will inform the BWFS, but it is uncertain how funding decisions will be informed.

A participant stated that the objectives for the BWFS were unclear and needed further clarification.

Gallery Walk, Reports Back, and Key Themes

During the workshop’s Gallery Walk exercise, participants had the opportunity to provide comments on the draft objective topics and potential metrics, which were printed on large posters. There were three main stations corresponding to the CVFPP goals: 1) Improve Flood System Management, 2) Promote Ecosystem Function, and 3) Improve O&M, Improve Institutional Support, Promote Multi-Benefit Projects. Participants were invited to write their comments on post-it notes and place them directly on the posters next to the objective topic or potential metric at issue.

There was also an Overview Station where Todd Bernardy (DWR-CVFPO) and Marc Hoshovsky (DWR-FESSRO) were available to answer questions and discuss broader topics related to the CVFPP, BWFS and Conservation Strategy.

Following the Gallery Walk exercise, DWR staff provided report-backs of key themes that emerged from the comments at their respective stations. A summary of the key themes identified by DWR staff as well as a brief synthesis of other key comments is provided below. A full list of comments from the Gallery Walk exercise can be found in Appendix C.

Workshop participants offered a number of comments that were targeted more broadly to the BWFS or Conservation Strategy measurable objectives process. Key examples included:

- Good start.
- There are too many objectives. DWR should strive to reduce or combine the objectives or separate them into short-term and long-term.

- The term “metric” needs to be clearly defined. Is it about achieving the objective or about measuring progress? You may not be able to achieve all objectives, but progress is still good.
- Clarification is needed around the role of the U.S. Army Corps in the BWFS and CS. Isn’t the BWFS a Federal-State feasibility plan? What assurances are there that DWR and the Army Corps are on the same page?
- There is a critical need for coordination between development of the BWFS and CS and the RFMPs.

The vast majority of the comments were directed to specific objective topics and metrics associated with the different stations. In general, these comments included suggestions to clarify, refine, or combine specific objective topics or metrics; or add new ones. The sections below include a summary of key recurrent, cross-cutting, or notable comments organized by Gallery Walk station.

Station A: Improve Flood System Management

- Consider cost of actions as a new metric.
- Potential metrics can include number of people affected by flooding including number of people who have faced life risk, loss of property, and other societal impacts. Consider these types of metrics for urban flood protection, small community protection and flood risk, and rural/agricultural area flood risk.
- Economic damages should examine broader economic impacts beyond local communities. California agriculture provides regional, state, and federal economic benefits.
- Regarding flexibility, it is important to assess the potential effects from climate change including monitoring temperature and modifying flood management actions accordingly.
- Consider the number of existing conservation plans that are integrated in the CVFPP as a new metric.
- Regarding resiliency, measure with resiliency measures. It will also be helpful to factor in recovery time after a failure. Consider time reduction for residents to return home or for businesses to reopen.
- “Non-structural actions” needs to be better defined. More detail would be helpful moving forward.

Station B: Promote Ecosystem Functions

- Define relationships between objectives. Explain how species or endangered species are affected, use models and define connections.
- The State needs to capture the range of conditions that can provide ecosystem benefits on floodplains.
- Regarding riparian habitats, it is important to consider a range of conditions beyond acreage, including habitat quality, habitat quantity, non-threatened and endangered (T&E) species, and use by target species.
- For evaluating the success of habitat, consider the response of species beyond T&E species. These species are important targets and are likely to better show short-term responses than T&E species.
- Species metrics should serve as menu options that locals have to choose, not one-size-fits-all or mandatory.

- Define “wildlife-friendly agriculture” among other terms such as “important species”.
- How Shaded Riverine Aquatic (SRA) cover relates to the USACE levee vegetation policy needs to be clarified.
- Consider compatibility with existing land use.
- Broaden the set of stressor objective topics, particularly flows. Track the amount of water (cfs) in the system at certain times of the year and track the number of flow events. Flows can be factored into objectives, metrics, and actions.
- Focus on gaining consistency between existing plans: broader FloodSAFE planning, other conservation plans, etc. Use a common language and common terms throughout the plans.

Station C: Improve O&M, Improve Institutional Support, Promote Multi-Benefit Projects

- Rural levees will be subject to failure or damage for events that exceed their designed level or protection. Design levees to minimize costs for exceedance events.
- Coordinate with landowners for long term O&M and agricultural interests. Farming in the bypasses is an effective, relatively cheap, self-sustaining, compatible way to accomplish long-term goals.
- Some metrics may be difficult to measure or track such as “Improved System Performance of Reliability” under “Consistent and Efficient O&M Practices.”
- More information should be utilized from within the Delta and local farmers and not as much from the State.
- Information and tools generated from the State should be shared as new technical information or tools are developed.
- Regarding databases, quality is more important than quantity. Utilize one high-quality database and share it between the State and local interests rather than sharing multiple databases.
- When the terms “and” and “or” are used, they are both meant but this is not reflected. This relates to the need for a common language and common definitions.
- Sustainable funding is important to all of the objectives.
- Develop cost and benefit to the State for entrance of rural systems. Use statewide benefits to pay for rural level of protection under SSIA if possible.
- The permitting process should be streamlined – establish a baseline, secure agency buy-in, etc.
- Permitting agencies should be brought on board as project partners to build a shared sense of ownership.
- The current costs of permitting should be identified; this will be needed to measure a reduction in permitting costs.
- It may be difficult to measure coordination. Identify the barriers to coordination and then develop metrics that address those barriers.
- It would be helpful to identify a metric for multi-benefit projects that are earlier in the pipeline. Since these projects are difficult to get started and have long timelines, money allocated to planning and design may serve as a catalyst for the projects.

Process for Developing Measurable Objectives Presentation

Following the Gallery Walk, Stacy Cepello (DWR-FESSRO) reviewed how the process of developing measurable objectives for the Conservation Strategy and BWFS would continue after the first Technical Workshop. DWR staff will revise the draft objective topics and potential metrics based on the input received. Additionally, DWR will take the next step of beginning to attach potential magnitudes to metrics (i.e., quantifying the objectives). Stacy mentioned that the process of developing measurable objective will be an iterative one. Tracking and evaluating progress toward achieving the CVFPP goals and objectives will be very important, and it has not yet been determined how often they will be reviewed. Objectives will be modified and adapted as new facts are learned and based on how the system changes in the process of CVFPP implementation.

Closing Remarks

Todd Bernardy (DWR-CVFPO) and Marc Hoshovsky (DWR-FESSRO) thanked workshop attendees for their participation. Marc stated that planning is very important, and working with stakeholders along the way will yield a stronger result. They reiterated the importance that technical information and feedback will consistently be shared between DWR, the RFMP process, and stakeholders.

Key Next Steps

- A second technical workshop will take place in fall 2013 to share some of the results from preliminary technical analysis that will help inform the possible range values of some of the metrics.
- Workshop participants were invited to submit workbooks of the draft objective topics and potential metrics (both electronic and printed) by Thursday, May 9, 2013.
- A post-workshop survey was circulated to participants and feedback was requested by Thursday, May 9, 2013. The survey results will be used to inform the design of the second technical workshop.
- A summary of the May 2, 2013 Technical Workshop will be developed and made available on the CVFMP website. It will include comments received from participants on the draft objectives and potential metrics, both during the workshop and those submitted following the workshop.
- DWR will evaluate comments submitted on the draft objective topics and potential metrics (both provided during the workshop and submitted via workbook) and revise accordingly, including:
 - Determining if DWR has addressed the underlying concern of the comment through other metrics;
 - Asking clarifying questions to specific participants as needed;
 - Discussing the objective topics and potential metrics with RFMP groups;
 - Assessing the practicality of tracking particular metrics; and
 - Sharing the revised objective topics and potential metrics with stakeholders, with the understanding that they are still subject to change throughout the planning process leading up to the 2017 CVFPP.

Appendix A – Workshop Agenda

Central Valley Flood Protection Plan Implementation Technical Workshop: Getting to Measurable Objectives Agenda

DATE: Thursday, May 2, 2013
CHECK-IN: 8:45 AM
WORKSHOP: 9:00 AM to 12:30 PM
LOCATION: West Sacramento City Hall Galleria
 1110 West Capitol Avenue
 West Sacramento, CA 95605

WORKSHOP GOALS:

- Describe the process by which Basin-wide Feasibility Study (BWFS)/Central Valley Flood System Conservation Strategy (CS) “measurable objectives” are being developed
- Provide an overview of the draft objective topics and potential metrics, and receive public input
- Provide an overview of the approach for developing detailed measurable objectives, and receive public input

#	Min	Start Time	Item	Presenter(s)
1.	15	9:00 a.m.	Welcome and Opening Remarks <ul style="list-style-type: none"> • Agenda Review • Introductions 	<ul style="list-style-type: none"> • Todd Bernardy, DWR • Marc Hoshovsky, DWR • Facilitator
2.	25	9:15 a.m.	Overview and Role of Objectives in BWFS/CS <ul style="list-style-type: none"> • Clarifying questions 	<ul style="list-style-type: none"> • Joe Bartlett, DWR • Stacy Cepello, DWR • Facilitator
3.	30	9:40 a.m.	Overview of Draft BWFS/CS Objective Topics and Potential Metrics <ul style="list-style-type: none"> • Describe draft BWFS/CS objective topics and potential metrics • Clarifying questions • Describe gallery walk activity 	<ul style="list-style-type: none"> • Joe Bartlett, DWR • Stacy Cepello, DWR • Facilitator
4.	10	10:10 a.m.	Break (<i>transition to gallery walk activity</i>)	

#	Min	Start Time	Item	Presenter(s)
5.	40	10:20 a.m.	Gallery Walk Activity <ul style="list-style-type: none"> Provide input on draft objective topics and metrics 	<ul style="list-style-type: none"> All
6.	15	11:00 a.m.	<i>Break (transition back to plenary)</i>	
7.	45	11:15 a.m.	Reports Back to Plenary	<ul style="list-style-type: none"> Station leads DWR
8.	20	12:00 p.m.	Process for Developing Measurable Objectives <ul style="list-style-type: none"> Examples of potential draft measurable objectives 	<ul style="list-style-type: none"> Joe Bartlett, DWR Stacy Cepello, DWR Facilitator
9.	10	12:20 p.m.	Next Steps	<ul style="list-style-type: none"> Todd Bernardy, DWR Marc Hoshovsky, DWR
10.	-	12:30 p.m.	<i>Adjourn</i>	

Appendix B – Workshop Participants (from sign-in sheet)

	Last Name	First Name	Organization
1.	Andrews	Betty	ESA PWA
2.	Armstrong	Gardner	Landowner RD108
3.	Banonis	Michelle	Bureau of Reclamation
4.	Barker	Kelley	California Department of Fish and Wildlife
5.	Bateni	Naser	GEI Consultants
6.	Bowles	Chris	CBEC
7.	Brown	Doug	Douglas Environmental
8.	Buck	Peter	California Levee Vegetation Research Program
9.	Cain	John	American Rivers
10.	Carter	Denise	Colusa County
11.	Chapman	Tom	HDR Engineering, Inc.
12.	Black-Davis	Christi	Edelman
13.	Clark	Susan	US Army Corps of Engineers
14.	Cocke	Mark	City of Woodland
15.	Coleman	Binta	DWR
16.	Countryman	Joseph	Central Valley Flood Protection Board
17.	Dirksen	Paul	West Sacramento Flood Control Agency
18.	Dolan	Jane	Central Valley Flood Protection Board
19.	Dulik	Karen	DWR
20.	Edgar	Bill	Central Valley Flood Protection Board
21.	Engler	Tom	MBK Engineers - Feather River Region
22.	Faghih	Jafar	HDR Engineering, Inc.
23.	Fredrickson	Justin	California Farm Bureau Federation
24.	Fritz	Chris	Peterson Brustad Inc.
25.	Fuentes	Jerry	US Army Corps of Engineers

26.	Hardesty	Mike	Reclamation District No. 2068
27.	Hendrick	Mike	NOAA Fisheries
28.	Herota	James	Central Valley Flood Protection Board
29.	Hertel	Meghan	Audubon California
30.	Hester	Gary	David Ford Engineer
31.	Hill	Reggie	Lower San Joaquin Levee District
32.	Hobbs	Jennifer	US Fish and Wildlife Service
33.	Holland	Kelly	AECOM
34.	Howard	Vance	AECOM
35.	Indrieri	Ashley	Family Water Alliance
36.	Katz	Jacob	CalTrout
37.	Leon	Abimael	California Department of Fish and Wildlife
38.	Lerner	Noel	DWR
39.	Londerholm	Andrew	State and Federal Contractors Water Agency
40.	Lorenzato	Stefan	RHJV
41.	Macdonald	Clyde	Central Valley Flood Protection Board
42.	Gilbert	Mark	ENGEO Incorporated
43.	Medders	Karen	North Delta Resident/Advocate
44.	Moricz	Nancy	Central Valley Flood Protection Board
45.	Pitto	Mary	Rural County Representatives of CA
46.	Porbaha	Ali	Central Valley Flood Protection Board
47.	Reinhard	Hilary	
48.	Rentner	Julie	River Partners
49.	Rice	Scott	DWR consultant (URS Corporation)
50.	Richardson	Norman	City of Rio Vista
51.	Roby	Ken	NOAA Fisheries
52.	Russo	Mitch	DWR Hydrology
53.	Sandner	James	US Army Corps Of Engineers

54.	Schmitt	Monty	Natural Resources Defense Council
55.	Seavy	Nat	PRBO Conservation Science
56.	Strachan	Susan	Sacramento River Conservation Area Forum
57.	Stresser	Andrew	RD 1001
58.	Suarez	Emma	Central Valley Flood Protection Board
59.	Swagerty	Helen	River Partners
60.	Terry	Melinda	CA Central Valley Flood Control Association
61.	Thomas	Joseph	AECOM
62.	Tompkins	Mark	NewFields
63.	Tull	Rob	CH2MHILL
64.	Vink	Erik	Trust for Public Land
65.	Weinrich	Doug	U.S. Fish and Wildlife Service
66.	Welsh	Daniel	U.S. Fish and Wildlife Service
67.	Williams	Andrea	California Department of Fish and Wildlife
68.	Williams	Matt	Citizen of Yolo County
69.	Wolford	Julie	NOAA Fisheries
70.	Yonemura	Randy	Calif. Indian Water Commission/ Ione Band of Miwok Indians (Represented by Anthony Burris)
71.	Zlotnick	Greg	San Luis & Delta-Mendota Water Authority

Staff Participants

Last Name	First Name	Organization
Bartlett	Joe	DWR-CVFPO
Bernardy	Todd	DWR-CVFPO
Biggs	Joshua	MWH
Bindra	Amy	DWR-CVFPO
Bishop	Debra	H.T. Harvey & Associates
Cepello	Stacy	DWR-FESSRO
Danna	Tony	DWR-FESSRO
Gaines	Terri	DWR-FESSRO
Gettleman	Ben	Kearns & West
Hall	Heidi	DWR-FESSRO
Hoshovsky	Marc	DWR-FESSRO
Hunter	John	AECOM
Khadam	Ibrahim	MWH
McDowell	Ray	DWR-FESSRO
Melcer	Ron	DWR-FESSRO
Ng	Michele	DWR-FESSRO
Parkin	Meredith	MWH
Poncelet	Eric	Kearns & West
Rugani	Kelsey	Kearns & West
Williams	Chris	DWR-CVFPO

Appendix C – Gallery Walk Comments

Note: in cases where workshop participants attributed a single comment to multiple objective topics or metrics, the comments have either been captured under the general comments sections below, or they have been listed multiple times next to the appropriate objective topic or metric.

General Comments		
<ul style="list-style-type: none">CS development currently has no public outreach component and <u>no</u> linkage to regional planning. Needs <u>both</u>. <u>Ecosystem related general</u>.Better defined roles / responsibilities would allow limits to move easily raise funding.Finance plan (like Conservation Strategy) is also a black box as far as public outreach and transparency. This needs correction.Where is the Army Corps? Isn't this a <u>Federal</u>- State feasibility plan? Why aren't they here and how do we know they are on the same page?Metric – definition: Is it about achieving the objective or measuring progress? You may not be able to achieve all objectives, but progress is still good.Too many objectives. Reduce or combine or separate into short-term, long-term.Marsh habitat metric should focus on quality (meeting multi-species objectives) rather than quantity (acreage). This applies to all habitat objectives.What species are you targeting? Metrics should not be based on miles / acres by species population.		
CVFPP Goals		
Improve Flood Risk Management		
Promote Ecosystem Functions	<ul style="list-style-type: none">Would like to know relationship of ecosystems goals to ESA compliance and mitigation as objectives that define things the law would require us to achieve.Need metrics across categories to gauge where achievements or definition of objectives in one category may bump up against or conflict with others.Public safety, economics, land use and available funding are important limitations on what we can achieve on ecosystem goals.Regional adherence, mitigation, integration of local and statewide flood improvements with achievable, broadly supported conservation projects is the way to go.	
Improve Operations & Maintenance		
Improve Institutional Support		
Promote Multi-Benefit Projects		
Objective Topic and Metrics		
1. People and Property at Risk – Risk flood risks to people and property within flood plains protected by the State Plain of Flood Control		
a. Urban Flood Protection	General	<ul style="list-style-type: none">Economics good but social dislocation, number of people that would suffer long-term dislocation or leave. – Households – Employment centers – Critical infrastructureNumber of people protected by incremental improvements.Shouldn't cost of an action be a metric? <input type="checkbox"/>Number of people who could be evacuated by local / regional plans.Is probability percentage the best way to measure? This will change every year- recommend design flows

		<p>and capacity.</p> <ul style="list-style-type: none"> • Risk to human life should not be measure in percent. Rather number of lives at risk. <input type="checkbox"/><input type="checkbox"/> • Flood risk to human life. Risk = Probability * number of people at x depth behind 100 year levee, 200 year levee, etc. • Metrics should not be used to prioritize flood risk reduction (for) against any other uses of flood management facilities. FRR (flood risk reduction) needs to be the paramount and overriding consideration. • Critical infrastructure damage. –Water treatment –Sewage –Employment Center –Telecommunication – Server Farms –Fire, Police, Medical
	1) Annual probability of flooding (% probability) in urban areas	<ul style="list-style-type: none"> • AEP may be achievable...but others may not be -> can only show progress. • Maybe able to predict % probability for a storm. Percent probability for failure is more difficult. • Maybe percent chance of flooding in a 30 year mortgage would be better for outreach to communities?
	2) Risk to human life, health and safety (%) in urban areas	<ul style="list-style-type: none"> • What is the trigger for being considered at risk?
	3) Damages to property and infrastructure (\$) in urban areas	
	4) Economic effects on regional economies (\$, employment)	
b. Small Community Flood Risk Reduction	General	<ul style="list-style-type: none"> • In addition to economic damages, we also need to consider the economic costs that may be shifted to small, disadvantaged rural communities, to increased flood insurance costs and building permits. Especially since risk will be concentrated in non-urban areas. • People and Property- Consider societal cost of people displaced by flooding, impacts may be more than just economic. • Economics good but social dislocation, number of people that would suffer long-term dislocation or leave. – Households – Employment centers – Critical infrastructure • Need to also capture “property damage.” • Baseline or legal and regulatory and public policy “floor” is important as an overarching guideline for all the other objectives, as these are not so much desired states and requirements. • Number of people protected by incremental improvements. • Shouldn’t cost of an action be a metric? <input type="checkbox"/> • Number of people who could be evacuated by local / regional plans. • Is probability percentage the best way to measure? This will change every year- recommend design flows and capacity. • Risk to human life should not be measure in percent. Rather number of lives at risk. <input type="checkbox"/><input type="checkbox"/> • Flood risk to human life. Risk = Probability * number of people at x depth behind 100 year levee, 200 year levee, etc. • Metrics should not be used to prioritize flood risk reduction (for) against any other uses of flood

		<ul style="list-style-type: none"> management facilities. FRR (flood risk reduction) needs to be the paramount and overriding consideration.
	1) Annual probability of flooding (% probability) for small communities	<ul style="list-style-type: none"> Maybe % chance of flooding in a 30 year mortgage would be better for outreach?
	2) Risk to human life, health, and safety (%) in small communities	<ul style="list-style-type: none"> What is the trigger for being considered at risk?
	3) Economic damages (\$) to small communities	
	4) Number of small communities with 100-year flood protection	<ul style="list-style-type: none"> Social issue of those communities that will not get 100 year protection. Shouldn't it be % of small communities with 100-year flood protection? Why is number of communities important? Why not population?
	5) Number of nonstructural actions in small communities	<ul style="list-style-type: none"> The number of actions may not be as crucial as nature of the actions. Why is number of communities important? Why not population?
c. Rural-agricultural Area Flood Risk Reduction	General	<ul style="list-style-type: none"> The economic impacts from not having appropriate flood protection such as diminished property values and permitting issues should also be considered. Economic damages should examine broader economic impacts, not just local. California agriculture provides regional, State and Federal economic benefits. <input type="checkbox"/> Assess increased levels of selenium and mercury (methylated mercury) with increased floodplain inundation. Rural levee repair cost reduction for events greater than their documented level of protection. (You need to predate present event repair costs). Cost to maintain existing system – lower O&M cost. Economic effects of flood risk reduction needs to be addressed up front. For example, longer and greater flooding of Yolo Bypass effectively makes farming the Bypass infeasible. Balance of farming and flood protection is essential! Economic effects needs to include effects of flood risk management measures that are implemented in rural areas for the benefit of urban area. Economics good but social dislocation, number of people that would suffer long-term dislocation or leave. – Households – Employment centers – Critical infrastructure Shouldn't cost of an action be a metric? <input type="checkbox"/> Is probability percentage the best way to measure? This will change every year- recommend design flows and capacity. Risk to human life should not be measure in percent. Rather number of lives at risk. <input type="checkbox"/><input type="checkbox"/> Flood risk to human life. Risk = Probability * number of people at x depth behind 100 year levee, 200 year

		<ul style="list-style-type: none"> levee, etc. Metrics should not be used to prioritize flood risk reduction (for) against any other uses of flood management facilities. FRR (flood risk reduction) needs to be the paramount and overriding consideration.
	1) Annual probability of flooding (%) in rural-agriculture areas	
	2) Risk to human life, health and safety (%) in rural areas	<ul style="list-style-type: none"> What is the trigger for being considered at risk?
	3) Damage to property, crops and infrastructure (\$) in rural areas	
	4) Economic effects on local economies (\$, employment)	
	5) Potential miles of rural levee that are accessible under all weather conditions	<ul style="list-style-type: none"> Should this say percent instead of potential?
	6) Number of nonstructural actions implemented within rural-agriculture floodplains	<ul style="list-style-type: none"> Number of non-structural measures not a measure of effectiveness. Develop effectiveness metric. Numbers- this is an accounting function and has no bearing on the performance of flood risk reduction. The number of actions may not be as crucial as nature of the actions.
2. Flood System Flexibility – Improve the ability of the flood management system to adapt to changing conditions (hydrologic, social, political, regulatory or ecological conditions)		
a. Flood System Flexibility	General	<ul style="list-style-type: none"> Consider local seepage issues to lands. Need system capacity requirements for regional plans now – for regions (by stretch of river). New metric: Design flow vs. peak flow that can be conveyed. Assess potential effects from climate change (i.e. ability of system to main rain capacities volume). Include temperature (real-time) monitoring to assess climate change impacts and modify flood management actions accordingly. None of these metrics gets at readiness or ability to accommodate climate change. Perhaps add increase in amount of floodplain area?
	1) Peak flood stage (or freeboard) that can be safety accommodated (feet)	<ul style="list-style-type: none"> Should be “safety.” Clarify what is meant by “accommodate” free board. This needs to be designed with regions after flows defined? Within each metric, identify whether “hydrologic, social, political, regulatory or ecological conditions.” Apply. E.g. Peak flood stage. Hydrological, social, political, regulatory. (Would not impact ecological changes.) These are all similar combine (2a 1-3).
	2) Peak flood flows (cubic feet per second) that can be safety conveyed	<ul style="list-style-type: none"> This needs to be designed with regions after flows defined? Within each metric, identify whether “hydrologic, social, political, regulatory or ecological conditions.” These are all similar combine (2a 1-3).

	3) Increase in flood frequency, peak flood volume, or peak flow (% increase) that can be safely accommodated	<ul style="list-style-type: none"> • Why peak flood “volume?” • This needs to be designed with regions after flows defined? • Within each metric, identify whether “hydrologic, social, political, regulatory or ecological conditions.” • Probability, not just straight percentage, may be better for risk assessment. • These are all similar combine (2a 1-3).
	4) Increase in operational flexibility (ability to manage the timing and magnitude of flood peaks in time)	<ul style="list-style-type: none"> • This needs to be designed with regions after flows defined? • Not sure how you would measure increased flexibility perhaps not the best metric? • Within each metric, identify whether “hydrologic, social, political, regulatory or ecological conditions.” • Unclear what measurement is being proposed.
	5) Increased flood warning time (% or hours / days) to support real-time operational flexibility and / or flood preparedness	<ul style="list-style-type: none"> • Percent of location where an increase in ability to safely manage peak flows can be coordinated with SSIA objectives including: “expansion and extension of flood bypass system, integrating ecosystem enhancements and combination of regional improvements.” • This needs to be designed with regions after flows defined? • Add low-flow flexibility to reduce impacts on farming. More farming, less O&M. • Within each metric, identify whether “hydrologic, social, political, regulatory or ecological conditions.”
3. Flood System Resiliency – Improve the ability of the flood management system to continue to function and recover quickly after damaging floods		
a. Flood System Resiliency	General	<ul style="list-style-type: none"> • What are the barriers to coordinate emergency response? – Develop metrics relevant to these barriers. (i.e.) – Funds in escrow for local flood fight. – MOU’s regarding State emergency reimbursement. • Terms “resiliency measures” and “non-structural measures” are vague. How do you measure if you don’t know what it is? • Resilience ties into wise floodplain management – proper zoning / land use policies should dictate what is built / not built in floodplains. • Climate change leads increased frequency of system stress – need to ensure ability to handle increased stress. • Resiliency is also measured by how quickly we can recover from a big flood. • This objective needs to be balanced with the ability of the farming economy within the flood management system to continue to function. • Resiliency: -Recovery time from a failure. –Reduce damages for flood longer than design of flood. • What is our resiliency baseline? Compare current resiliency (%) to that of a system with compatible land use plans? • To reduce cost of recovery, reduce overhead. Set the parameters then get out of the way. Let the locals so their jobs. • Generally, address climate change impacts here and elsewhere. • Time reduction for residents to return home or businesses to reopen. <input type="checkbox"/><input type="checkbox"/>
	1) Reduction in economic damages (\$ or %) with and without added resiliency measures	<ul style="list-style-type: none"> • Not clear why you are measuring without resiliency measures. <input type="checkbox"/> • Should only be “with.”

	2) Number of resiliency measures implemented in high-risk areas	<ul style="list-style-type: none"> Why is “number” important?
	3) Reduction in cost of post-flood recover efforts (\$ or %)	<ul style="list-style-type: none"> Can only measure after an event and then it depends on the events flood elevation, duration, etc. This is not a reliable metric.
	4) Number of emergency preparedness and flood recovery plans, or % of populated areas with flood recovery plans	<ul style="list-style-type: none"> This metric is limited to plans, not system fixes. Can it be broadened? Also add that Emergency Preparedness and Flood Recovery Plans must be “practiced and resourced.”
4. Wise Floodplain Management – Wisely manage floodplains protected by the SPFC to manage residual risks, particularly in areas of deep or rapid flooding		
a. Wise Floodplain Management	General	<ul style="list-style-type: none"> Impacts to rural areas and stakeholders need to be considered when determining areas that will be delineated as flood plains. Need landowner involved, buy-in and potential mitigation. Add this objective metric: 4.a.4) No net increase in risk / consequences throughout Basin. FEMA issues should be considered here. Ex. Ag is a compatible F.P. use, but current NFIP regulations and insurance increases do not allow for sustainability. Will you do a baseline? How do you track metric path without baseline? If putting floodplain easements on productive agricultural land, what is metric to assess economic impacts? <input type="checkbox"/> Consider the number existing conservation plans that are integrated in the CVFPP as a metric. <input type="checkbox"/> What are the barriers to coordinate emergency response? – Develop metrics relevant to these barriers. (i.e.) – Funds in escrow for local flood fight. – MOU’s regarding State emergency reimbursement. Terms “resiliency measures” and “non-structural measures” are vague. How do you measure if you don’t know what it is?
	1) Total acres or % of floodplains with flood-compatible land uses preserved (through easements or other means)	<ul style="list-style-type: none"> Should be % of floodplains with flood camp with the intent to trying to get to 100%.
	2) Number of land-use plans compatible with floodplain risks and functions	<ul style="list-style-type: none"> Compatibility metrics are more important than number of plans. Why is “number” important? What does “compatible” mean?
	3) Number of nonstructural actions implemented within SPFC floodplains	<ul style="list-style-type: none"> What are the non-structural actions? Define. <input type="checkbox"/> Why is “number” important? What does “compatible” mean? Define SPFC floodplains.
5. Ecosystem Processes – Improve and enhance natural dynamic natural hydrologic and geomorphic processes		

a. Inundated Floodplain	General	<ul style="list-style-type: none"> • Need to integrate regional restoration / conservation program objectives into the CVFPP land into the regional planning efforts. • Maximize State and Federal owned land. Don't take agricultural land out of production or make it marginal. • Floodplain habitat objective should support other State / Federal objectives for riparian habitat and Salmon Doubling goals. • Increase in inundated floodplain <u>without</u> reduction of farm income reduction. • Duration of inundation is important. Juvenile fish need time to grow and need to be able to exit the system at appropriate time to continue journey to ocean. • Acres and miles do not necessarily relate to successful performance, what is the performance monitoring? • Increase water holding capacity of soils in upper level of watersheds (forests, tree thinning, etc.). • Metrics are a great overall step forward in defining multi-benefit flood projects, but metrics must be SMART, specific, measureable, actionable, realistic and time-bound. For example, floodplain metrics must have temporal components. Simple extent is inadequate magnitude (depth and surface extent of inundation) seasonal timing, frequency and duration all crucial elements of functional floodplain habitat.
	1) Total amount (acres, expected annual habitat (EAH) units) with sustained spring and 50 –percent frequently activated floodplain	<ul style="list-style-type: none"> • What are we trying to accomplish by having inundated floodplains? Where is it needed based on data? Don't just take agricultural land out of production. Minimize. • Explain EAH – new added each year or total per year (existing and new)? • Define “expected” = available and depending on flows? Can this be predicted? • Define 50% frequently activated floodplain.
	2) Total amount of expected annual inundated floodplain habitat (acres)	<ul style="list-style-type: none"> • What are we trying to accomplish by having inundated floodplains? Where is it needed based on data? Don't just take agricultural land out of production. Minimize. • The amount of acres is <u>NOT</u> unlimited. There is a finite amount available. If species is important, is the goal, then the metric to be measured should be fish population, not acres.
b. Riverine Geomorphic Processes	General	<ul style="list-style-type: none"> • Need to integrate regional restoration / conservation program objectives into the CVFPP land into the regional planning efforts. • Is meander the only geomorphic metric, at what extent eroding bank gravel distribution. • Dredge baby, dredge! • Increase water holding capacity of soils in upper level of watersheds (forests, tree thinning, etc.). • Metrics are a great overall step forward in defining multi-benefit flood projects, but metrics must be SMART, specific, measureable, actionable, realistic and time-bound. For example, floodplain metrics must have temporal components. Simple extent is inadequate magnitude (depth and surface extent of inundation) seasonal timing, frequency and duration all crucial elements of functional floodplain habitat.
	1) Natural Bank – total length (miles)	<ul style="list-style-type: none"> • What does natural bank mean? Bank without rock?
	2) River Meander Potential – total amount (acres)	<ul style="list-style-type: none"> • What are we measuring? Should be species / not miles or acres. • If meander is the metric, should we periodically measure actual meander, not potential (e.g. Eric Larsen). • What does “potential” mean?
6. Habitats – Increase and improve quantity, diversity, quality, and connectivity of riverine aquatic and floodplain habitats		

a. Shaded Riparian Aquatic (SRA) Cover	General	<ul style="list-style-type: none"> Multi-benefit flood projects are great, BUT flood protection and public safety MUST be the priority. Increase in flood habitat or reduction in larger events. Need metrics to quantify quality (as title states) of habitat- can use diversity, species, etc. Increase in species count (trend) by acres. Consider using ecosystem response – e.g. RHJU or CUJU focal species as metrics of habitat quality. Measure what has been restored over the past 20 years. Metrics to identify / implement alternative methods that may be utilized by local maintenance districts for levees that are species friendly (ways to biologically monitor success), if objective is increase establishing baselines for all habitats is important. Needs to be clarified – is a goal to have in future <u>if</u> and when USACE levee vegetation policy is modified at least for project levees? Need to integrate regional restoration / conservation program objectives into the CVFPP land into the regional planning efforts.
	1) Shaded Riverine Aquatic Cover and Bank and Vegetation Attributes of SRA Cover – total length (miles)	<ul style="list-style-type: none"> Must measure in % rather than miles. You may have inaccurate data due to areas of nonconformance to. Why not square miles?
	2) Total length and % of bank affected by flood projects that incorporate SRA attributes	<ul style="list-style-type: none"> Don't quite understand this. Would this include areas that are rocked and then planted with vegetation? What does "affected" mean? Total length and % of bank which can incorporate SRA attributes after future improvement (i.e. identify locations which previously had known SRA attributes).
b. Riparian	General	<ul style="list-style-type: none"> Specify hydraulically connected and disconnected (separated by levee) Riparian, marsh and floodplain agriculture are subset of inundated floodplain (5a), as relates to fish benefit. Multi-benefit flood projects are great, BUT flood protection and public safety MUST be the priority. Riparian, marsh and floodplain agriculture are cover types, not habitat. Their function as habitat is related to frequency of inundation (5a). Great start. Needs to capture range of conditions that can provide ecosystem benefits on floodplains. Not in my backyard- there are already incredible riparian areas along the Sacramento River- don't need more. What about adding proximity to other riparian areas? It also seems to be missing a metric for habitat complexity or diversity. What about metrics that measures species abundances and areas with cottonwood willow recruitment? Need metrics to quantify quality (as title states) of habitat- can use diversity, species, etc. Need a metric to identify increases in maintenance costs. At some point you will reach a maximum on lands available, so species population is better measuring metric. If goal is more fish than metric should be fish. More acres doesn't always translate to species improvement. Should add third metric, 3. Habitat Diversity, total amount (acres) of each type / life stage is available. This will

		<p>meet your CVFPA 2008 environmental goal 2, which specifies quantity, <u>diversity</u> and connectivity.</p> <ul style="list-style-type: none"> • Increase in species count (trend) by acres. • Consider using ecosystem response – e.g. RHJU or CUJU focal species as metrics of habitat quality. • Habitat quality and use by target species is also important, not just acreage. <input type="checkbox"/> • Metrics to identify / implement alternative methods that may be utilized by local maintenance districts for levees that are species friendly (ways to biologically monitor success), if objective is increase establishing baselines for all habitats is important. • Need to integrate regional restoration / conservation program objectives into the CVFPP land into the regional planning efforts.
	1) Habitat Amount – total amount (acres)	<ul style="list-style-type: none"> • Total amount of habitat should also consider impacts to private property and avoid eminent domain to create habitat.
	2) Habitat Connectivity – median patch size (acres) and perimeter-to-area ratio	<ul style="list-style-type: none"> • Why perimeter area ratio?
c. Marsh	General	<ul style="list-style-type: none"> • Specify hydraulically connected and disconnected (separated by levee) • Riparian, marsh and floodplain agriculture are subset of inundated floodplain (5a), as relates to fish benefit. • Multi-benefit flood projects are great, BUT flood protection and public safety <u>MUST</u> be the priority. • Marsh habitat metric should focus on quality (meeting multi-species objectives) rather than quantity (acreage). This applies to all habitat objectives. • Riparian, marsh and floodplain agriculture are cover types, not habitat. Their function as habitat is related to frequency of inundation (5a). • Perennial <u>and</u> seasonal (floodplain habitat) • Great start. Needs to capture range of conditions that can provide ecosystem benefits on floodplains. • The “active floodplain” land not in production is called “marsh?” This must be clarified. • Need metrics to quantify quality (as title states) of habitat- can use diversity, species, etc. • At some point you will reach a maximum on lands available, so species population is better measuring metric. If goal is more fish than metric should be fish. More acres doesn’t always translate to species improvement. • Consider using ecosystem response – e.g. RHJU or CUJU focal species as metrics of habitat quality. • Metrics to identify / implement alternative methods that may be utilized by local maintenance districts for levees that are species friendly (ways to biologically monitor success), if objective is increase establishing baselines for all habitats is important. • Need to integrate regional restoration / conservation program objectives into the CVFPP land into the regional planning efforts.
	1) Habitat Amount – total amount (acres)	<ul style="list-style-type: none"> • Habitat quantity and use by target species is also important, not just acreage.
	2) Habitat Connectivity – median patch size (acres) and perimeter-to-area ratio	<ul style="list-style-type: none"> • Why perimeter area ratio?

	to-area ratio	
d. Floodplain Agriculture	General	<ul style="list-style-type: none"> • Need to do science research on harm to salmon from warm water temperatures if in shallow water for several days. Once stressed by warm water temperatures they stop eating and don't recover. Central Valley is HOT. How many days or hours of 75 degree days does it take to be sub-lethal? <input type="checkbox"/> • Habitats. Floodplain agriculture should be its own category. It is habitat, O&M, wise floodplain use, etc., etc. • Specify hydraulically connected and disconnected (separated by levee) • Riparian, marsh and floodplain agriculture are subset of inundated floodplain (5a), as relates to fish benefit. • Multi-benefit flood projects are great, BUT flood protection and public safety <u>MUST</u> be the priority. • Riparian, marsh and floodplain agriculture are cover types, not habitat. Their function as habitat is related to frequency of inundation (5a). • Need metrics to quantify quality (as title states) of habitat- can use diversity, species, etc. • At some point you will reach a maximum on lands available, so species population is better measuring metric. If goal is more fish than metric should be fish. More acres doesn't always translate to species improvement. • Consider using ecosystem response – e.g. RHJU or CUJU focal species as metrics of habitat quality. • Metrics to identify / implement alternative methods that may be utilized by local maintenance districts for levees that are species friendly (ways to biologically monitor success), if objective is increase establishing baselines for all habitats is important. • Need to integrate regional restoration / conservation program objectives into the CVFPP land into the regional planning efforts.
	1) Habitat Amount – total amount (acres) of wildlife-friendly floodplain agriculture	<ul style="list-style-type: none"> • Please define wildlife-friendly floodplain agriculture. <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> • Definition of “wildlife friendly” agriculture - what actions could CVFPP take to increase this metric? • Why not agriculture friendly habitat?
7. Species – Contribute to the recovery and stability of native species populations and overall biotic community diversity		
a. Threatened and Endangered Target Species	General	<ul style="list-style-type: none"> • Need to develop quantitative objectives that support existing state and federal objectives like the SD Goal • Add metric: Connectivity, continuous habitat in the analysis. • Consider species sustainability rather than stability. • Add objective: 7b – All native species. • The locals need these targeted species plans and metrics sooner than later to provide input and to try to integrate them into RFMPs to increase their funding, incorporation of ecosystem functions into their flood management activities and increased permitting efficiency. • Consider what species may be pushed out by potential changes to habitat (loss of habitat). • We need to get a head of the extinction curve. Must use non-T&E species as well. • For evaluation the success of habitat – consider the response of species beyond T&E species. Examples include RHJU and CUJU focal species. Also Sacramento Splittail. These species are important targets and likely to show short term responses than T&E species. <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> •

	1) Species specific metrics are being developed for 17 targeted species, for inclusion as part of design features and restoration actions	<ul style="list-style-type: none"> • Could include population targets and / or habitat conditions. Consider adding focal species and TE. • Also, for SPP recovery, mitigation / conservation needs to occur at a landscape / ecosystem scale. Look at the full needs of the SPP and include. • Species metrics should be like menu options locals have to choose, which ones fit best with their project, so not one-size-fits-all or mandatory.
8. Stressors – Reduce stressors related to the development and operation of the flood management system that negatively affect important species		
a. Revetment	General	<ul style="list-style-type: none"> • Suggest 8f: Flows. More water needed to activate floodplain and allow the river to work where we can give it more room. 1) Amount of water (cfs) in system at certain RMs / times of year. 2) Number of types of flow events. • Use existing data. Feds have goals and priorities many diversions have been screened. Screening them all would take a lifetime. • Also need to include flow or lack thereof, as a stressor. • Flows are a stressor and need to have objectives and metrics incorporated regardless of who operates them within a watershed. • Define “important” species.
	1) Revetment Removed to Increase Meander Potential and / or Natural Bank (without negatively affecting flood safety) – total length (miles)	<ul style="list-style-type: none"> •
b. Levees	General	<ul style="list-style-type: none"> • Suggest 8f: Flows. More water needed to activate floodplain and allow the river to work where we can give it more room. 1) Amount of water (cfs) in system at certain RMs / times of year. 2) Number of types of flow events. • Use existing data. Feds have goals and priorities many diversions have been screened. Screening them all would take a lifetime. • Need categories for type removed (partial / seasonal / full) fish passage barriers. • Your metrics seem to indicate that the problem with levees, is where they don’t allow sufficient room for natural river processes and frequently flooded floodplains, not clear how this is described in other documents but it should be. To make clear that we will be living with levees. To help determine what area would be most beneficial ecologically and flood wise set back. • Also need to include flow or lack thereof, as a stressor. • Add metric: Amount of floodplain by moving levees (may not correlate to length of setback so it needs its own metric). • Flows are a stressor and need to have objectives and metrics incorporated regardless of who operates them within a watershed. • Define “important” species.

	1) Levees Relocated to Reconnect Floodplain or improved to Eliminate Hydraulic Constraints on Restoration (where consistent with flood risk management) – total length (miles)	<ul style="list-style-type: none"> • Levee setbacks reduce / eliminate hydraulic constraints on the system as a whole not just restoration. They are multi-beneficial. • Great metric.
	2) Miles and % of flood channel with adequate capacity to support riparian vegetation	<ul style="list-style-type: none"> • Miles of additional habitat accessible upstream of barriers. • Great metric. • This metric might be best served under 6a. • Miles is not a good metric. Storage reduction, maybe? • Define “capacity?”
c. Fish Passage Barriers	General	<ul style="list-style-type: none"> • Suggest 8f: Flows. More water needed to activate floodplain and allow the river to work where we can give it more room. 1) Amount of water (cfs) in system at certain RMs / times of year. 2) Number of types of flow events. • Use existing data. Feds have goals and priorities many diversions have been screened. Screening them all would take a lifetime. • Add: Number of “fish passage barriers <u>modified</u>” (e.g. addition of fish ladders to enable passage). • Also need to include flow or lack thereof, as a stressor. • Flows are a stressor and need to have objectives and metrics incorporated regardless of who operates them within a watershed. • Define “important” species.
	1) Number of fish passage barriers removed	<ul style="list-style-type: none"> • This needs to include all fish passage barriers not just DWR operated or maintained ones.
d. Diversions	General	<ul style="list-style-type: none"> • Suggest 8f: Flows. More water needed to activate floodplain and allow the river to work where we can give it more room. 1) Amount of water (cfs) in system at certain RMs / times of year. 2) Number of types of flow events. • Use existing data. Feds have goals and priorities many diversions have been screened. Screening them all would take a lifetime. • This should include all diversions, not just DWR operated or maintained diversions. • Also need to include flow or lack thereof, as a stressor. • Flows are a stressor and need to have objectives and metrics incorporated regardless of who operates them within a watershed. • Define “important” species. • Define “diversions.”
	1) Number of diversions screened or removed	<ul style="list-style-type: none"> •

	2) Miles of additional habitat accessible upstream	<ul style="list-style-type: none"> Define “accessible.” Why “miles?” Why “upstream?”
e. Invasive Plants	General	<ul style="list-style-type: none"> Suggest 8f: Flows. More water needed to activate floodplain and allow the river to work where we can give it more room. 1) Amount of water (cfs) in system at certain RMs / times of year. 2) Number of types of flow events. CSU has mapped some invasive, 100% flight. Reduction of invasive plants thru O&M. Use existing data. Feds have goals and priorities many diversions have been screened. Screening them all would take a lifetime. Also need to include flow or lack thereof, as a stressor. Flows are a stressor and need to have objectives and metrics incorporated regardless of who operates them within a watershed.
	1) Invasive Plant-Dominated Vegetation – total area (acres)	<ul style="list-style-type: none">
9. Long-term Cost of O&M – Reduce the long-term cost of SPFC O&M through more sustainable physical conditions and improved facility reliability		
a. Cost of O&M	General	<ul style="list-style-type: none"> Focus on resolving encroachments, both permits and unauthorized. Rural levees will be subject to failure / damage for events that <u>exceed</u> their design level of protection. Design levees to minimize the costs for exceedance events. <input type="checkbox"/> Coordinate O&M cost with local farm resources. Farming does the O&M at no cost to DWR and they do it better!!
	1) Reduction in long-term O&M costs (\$ or %)	<ul style="list-style-type: none"> Not realistic to say “reduction” because cost will rise with time. Better to say “reduce the increase.”
	2) Reduction in long-term repair costs (\$ or %)	
	3) Reduction in ecosystem stressors or constraints (see also metrics under 8. Stressors)	<ul style="list-style-type: none"> What is correlation between reduction in eco stressors and O&M?
10. Consistent and Efficient O&M Practices – Develop SPFC maintenance practices that reduce costs, improve system performance, and promote ecosystem functions		
a. Efficiency and Consistency	General	<ul style="list-style-type: none"> Farming in the bypasses is the very best and cheapest, self-sustaining, compatible way to accomplish long-term goals (O&M General). <input type="checkbox"/> Reduce overhead costs by reducing government <u>interloping</u> and interference Need method to track loss and provide for accountability of O&M actions. This will allow O&M entities the ability to find reductions in the future. Wrong metric. Should be reduced O&M demand. We should design this work out of the system where possible money is not a good surrogate. Consistent and efficient O&M suggest adding / developing better definition of responsibilities. State and

		<p>Federal have historically “repaired,” now burden is being shifted back to locals.</p> <ul style="list-style-type: none"> • O&M costs are often fixed or increasing when budgets are limited and / or funding non-sustained, deferred maintenance costs rise! Metric: Develop sustainable funding in some O&M. • Local farming of flood infrastructure is the most efficient method of O&M. It is crucial that farming practices are integrated into O&M methods. Better efficiency. Better consistency. Lower cost to DWR. • More real input from in-Delta DWR. More real input from local farmers. RD’s- <u>less</u> agencies. Government tilts. <input type="checkbox"/> • Get state to reimburse local RD’s so RD’s can move forward with their next projects.
	1) Reduction in long-term O&M costs (\$ or %)	
	2) Improved system performance or reliability	<ul style="list-style-type: none"> • How would you measure this metric? Seems difficult to track. <input type="checkbox"/>
11. Collaboration and Regional Governance – Increase collaboration among flood managers, regulatory agencies, conservation planners, non-governmental organizations, agricultural and other interests		
a. Collaboration and Governance	General	<ul style="list-style-type: none"> • Add a metric that gets at multiagency (including resource agencies) collaboration not sure you want to measure it by the number of them but the effectiveness of them (maybe number participating entities) • Hard to measure coordination- What are the barriers to coordination and then develop metrics that address those barriers. <input type="checkbox"/> • Look at multiple benefits. Collaborate with other projects to work for same goals and permit requirements, combine <u>funding</u>. • CS development currently has no public outreach component and <u>no</u> linkage to regional planning. Needs <u>both</u>. <u>Ecosystem related general</u>. • Engage tribal governments early in the process. Work with regional agencies to facilitate this collaboration. Metric: Number of tribes involved / impacted • All of this is <u>way too</u> much “governance” = social engineering = spending too much money on government and not projects. • Collaborative actions achieved. • Number of groups equates to number of meetings- can be tilted towards State Agencies. Could indicate success when local stakeholders are on the list but cannot participate. • These should be bottom heavy, meaning more local, elected rep / control then add state, federal, NGO outside interests to mix.

	1) Number of multi-agency / multi-interest projects implemented	<ul style="list-style-type: none"> Why “number?”
	2) Number of maintaining agency partnerships or consolidated local maintaining agencies formed (or, reduction in the total number of SPFC maintaining entities)	<ul style="list-style-type: none"> Does plan call this out as a problem?
	3) Number of regional resource management groups formed	
12. Sustainable Funding – Improve the long-term sustainability of flood management funding		
a. Funding	General	<ul style="list-style-type: none"> Isn’t sustainable funding important to all the objectives? Is it more of a principle? You can’t accomplish anything without money. <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> Develop cost and benefit to the State for entrance of rural systems. Use their statewide benefits to help pay for rural level of protection under SSIA. <input type="checkbox"/> How do we manage costs that are redirected from urban areas to rural? Usually from higher income to disadvantaged communities. This cuts across many objectives, not just funding.
	1) Number of new local / regional / State funding mechanisms	<ul style="list-style-type: none"> Why “number?” Neither of these really seem to get the idea of sustainable money. Perhaps look at the length of the time funding would be available for the number of projects with costs covered for X years.
	2) Increase in the diversity of long-term funding mechanisms for SPFC improvement, maintenance and repairs	<ul style="list-style-type: none"> How do you measure “diversity?” Neither of these really seem to get the idea of sustainable money. Perhaps look at the length of the time funding would be available for the number of projects with costs covered for X years.
13. Information and Tools – Improve the quality and availability of information and tools that inform flood management		
a. Information and Tools	General	<ul style="list-style-type: none"> Education and outreach – Support of projects. <input type="checkbox"/> What about measuring the use of the data sets and tools rather than giving credit for just creating more data or tools but <input type="checkbox"/> insuring they’re useful Also need to be available to local government planning, public works, safety / flood prevention to assist with the plans they need / must accomplish. <input type="checkbox"/>

		<ul style="list-style-type: none"> • Coordination and integration with existing public tools. • Use and accessibility of public tools. <input type="checkbox"/>
	1) Number of databases or tools available to public	<ul style="list-style-type: none"> • Why “number?” What are you solving?
14. Project Approvals – Improve the efficiency of project implementation (time and cost of approvals), and success of conservation and mitigation		
a. Permit Costs	General	<ul style="list-style-type: none"> • Do we know what current costs are for permitting? Can’t compare the reduction without knowing <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> • <u>Cost</u> of permits -> time of permit process and confusing / conflicting conditions from the variety of agencies involved and regulatory. <input type="checkbox"/> • Get agencies on board as project partners “ownership.” <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> • <u>Institutional support</u>: Need a way to have agencies that issue permits recognize value of these actions and prioritize or accept their merits without burdensome leg work. <input type="checkbox"/>
	1) Reduced average cost of project permits and other regulatory requirements (\$ / project or % project cost)	<ul style="list-style-type: none"> • “Reduced” Will this be compared to past projects or the CVFPP permitted activities to be reduced over time? These costs and time are very dependent on the number of permits needed, type of activities, location, habitat, etc.
	2) Reduced total cost for permitting SPFC flood management activities (as a portion of total cost)(%)	<ul style="list-style-type: none"> • “Reduced” Will this be compared to past projects or the CVFPP permitted activities to be reduced over time? These costs and time are very dependent on the number of permits needed, type of activities, location, habitat, etc.
	3) Reduced cost of mitigation (total or per credit)	<ul style="list-style-type: none"> • “Reduced” Will this be compared to past projects or the CVFPP permitted activities to be reduced over time? These costs and time are very dependent on the number of permits needed, type of activities, location, habitat, etc. • Reduced cost of mitigation. This may not be representative due to different costs for land (higher in urban environment T&E species land vs. general riparian etc.). • Why “mitigation?”
b. Efficiency	General	<ul style="list-style-type: none"> • Do we know what current costs are for permitting? Can’t compare the reduction without knowing. Do you know the time it actually takes? • What about adding a metric for number of projects with integrated ecosystem rest? <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/>
	1) Reduced time to acquire permits (days / project, average or % reduction in average	<ul style="list-style-type: none"> • “Reduced” Will this be compared to past projects or the CVFPP permitted activities to be reduced over time? These costs and time are very dependent on the number of permits needed, type of activities, location, habitat, etc.

	time for approvals)	
	2) Increase in acreage covered by regional or consolidated permitting mechanisms (acres or % of total acres)	<ul style="list-style-type: none"> • Need a baseline for what it currently takes to get permits (by type). • Why is this an “efficiency?”
	3) Amount of advance mitigation lands acquired (acres)	<ul style="list-style-type: none"> • Reduced cost of mitigation. This may not be representative due to different costs for land (higher in urban environment T&E species land vs. general riparian etc.). • Why “efficiency?”
15. Integrated Water Management – Promote design of multi-benefit projects that integrate other resource needs (ecosystem, water supply, recreation, etc.), where feasible		
a. Multi-benefit Projects	General	<ul style="list-style-type: none"> • Need metric for multi-benefit earlier in the pipeline. Hard to get them started. Long timelines. Money allocated to planning and design. <input type="checkbox"/> • Integration with ecosystem benefits – e.g. the number of projects that contribute to ecosystem. • Acres of benefit by type from multi-benefit project. • Is there an avenue for prioritizing multi-benefit projects over single benefit ones? What is it? • What about coordination with IRWM regions? • Should add metrics: 15a4) Number of benefits within the proposed multi-benefit project. <input type="checkbox"/><input type="checkbox"/>15a5) Cost per benefit proposed to be gained. • Add metric: Number of multi-benefit projects that incorporate SSIA objectives such as: expansion and extension of the flood bypass system, integration of ecosystem enhancements and combination with regional improvements.
	1) Funding allocated to multi-benefit projects (\$ or % of total)	<ul style="list-style-type: none"> • Should identify cost for other resource needs.
	2) Number of multi benefit flood management projects implemented	<ul style="list-style-type: none"> • Why is “number” critical?
	3) Number of projects that integrate and/or complement the integrated water management objectives of other projects / programs	<ul style="list-style-type: none"> • Why is “number” critical? • This is too vague.

Appendix D – Workbook Comments

Note: in order to reduce the size of Appendix D, potential metrics for which no comments were provided have been deleted.

General Comments		
<ul style="list-style-type: none"> There was much discussion at the May 2nd meeting about the applicability of system wide indicators to regional plans. Perhaps this question could be reframed as: "what indicators would be useful at the Regional Planning scale?". I assume there would be a great deal of overlap between planning regions in terms of metrics. It also seems likely that at least some of these metrics could be aggregated upward to the system wide scale. General comments -- 1) "number of" metrics are typically weak, as the scale of the investment/effects of each can vary wildly. I've flagged metrics like this where I think they are still worth using. 2) Application of these metrics will need to evaluate NET changes, as in many cases there will be disbenefits as well as benefits, some of which could be captured by these metrics. 3) definitions of these metrics will be key to their appropriateness, but I recognize we aren't there yet and will not repeatedly make that comment. 		
Objective Topic and Metrics		
16. People and Property at Risk – Risk flood risks to people and property within flood plains protected by the State Plain of Flood Control		
a. Urban Flood Protection	General	<ul style="list-style-type: none"> How is health defined? Hazardous materials should be included, or is this part of 'health'? For 1b, 1a, and 1c, there should be an emphasis on how projects, regardless of their location, benefit the flood system as a whole. The way it is mapped out and discussed, it makes flood management look secular, this has caused problems in the past. System needs to be viewed as 'one'.
	2 Risk to human life, health and safety (%) in urban areas	<ul style="list-style-type: none"> do you mean % change?
	4 Economic effects on regional economies (\$, employment)	<ul style="list-style-type: none"> Not sure how you would readily calculate this, unless you adopt a large scale econ model.
b. Small Community Flood Risk Reduction	General	<ul style="list-style-type: none"> For 1b, 1a, and 1c, there should be an emphasis on how projects, regardless of their location, benefit the flood system as a whole. The way it is mapped out and discussed, it makes flood management look secular, this has caused problems in the past. System needs to be viewed as 'one'.
	1 Annual probability of flooding (% probability) for small communities	<ul style="list-style-type: none"> Not sure how you would readily calculate this, unless you adopt a large scale econ model.
	6 Number of nonstructural actions in small communities	<ul style="list-style-type: none"> This is not a measure of this objective!

c. Rural-agricultural Area Flood Risk Reduction	General	<ul style="list-style-type: none"> Similar to comment above, need to look at overall flood reduction. Health and safety cannot be viewed the same in rural as it is in urban, this needs to be detailed. For 1b, 1a, and 1c, there should be an emphasis on how projects, regardless of their location, benefit the flood system as a whole. The way it is mapped out and discussed, it makes flood management look secular, this has caused problems in the past. System needs to be viewed as 'one'. Metric is needed: <ul style="list-style-type: none"> Flood capacity provided to protect urban areas Economic value of that protection to urban areas Economic impacts of that protection to the small communities and rural-agricultural areas. Change in flood risk borne by small communities and/or rural-agricultural areas to provide that protection.
	2 Risk to human life, health and safety (%) in rural areas	<ul style="list-style-type: none"> This is not a measure of this objective!
	6 Number of nonstructural actions implemented within rural-agriculture floodplains	<ul style="list-style-type: none"> This is not a measure of this objective!
2. Flood System Flexibility – Improve the ability of the flood management system to adapt to changing conditions (hydrologic, social, political, regulatory or ecological conditions)		
a. Flood System Flexibility	General	<ul style="list-style-type: none"> How is 'safety' defined in 1 and 2? When looking at 3-5, are % increases being compared to current baseline numbers? How is this or will this be done? Should look at how long-term maintenance on the system will be compared to baseline. Reduced? Increased? Same? Need to look at operation and maintenance costs compared to baseline levels. Metric is needed: <ul style="list-style-type: none"> Flood capacity provided to protect urban areas Economic value of that protection to urban areas Economic impacts of that protection to the small communities and rural-agricultural areas. Change in flood risk borne by small communities and/or rural-agricultural areas to provide that protection. Change in flooding of agricultural lands and economic impact of that change.
	1 Peak flood stage (or freeboard) that can be safely accommodated (feet)	<ul style="list-style-type: none"> a repeated mistake - this should be "safely," of course
	4 Increase in operational flexibility (ability to manage the timing and magnitude of flood peaks in	<ul style="list-style-type: none"> Don't know how you will quantify this.

	time)	
3. Flood System Resiliency – Improve the ability of the flood management system to continue to function and recover quickly after damaging floods		
a. Flood System Resiliency	General	<ul style="list-style-type: none"> Add metric: 5) Long-term O&M reduction I think this definition should be expanded to address the probability of effectiveness in the face of uncertainty. That aspect of resiliency should be fundamental to flood risk management objectives.
	1 Reduction in economic damages (\$ or %) with and without added resiliency measures	<ul style="list-style-type: none"> Should address transfer of risk and economic damages from urban to rural-agricultural areas.
	2 Number of resiliency measures implemented in high-risk areas	<ul style="list-style-type: none"> Similar to 3a (2) (#of resiliency measures) using the objective as the measure has weaknesses. The objective is intended to meet some outcome; the outcome is what should be measured. In this case, perhaps miles of habitat re-connected.
	3 Reduction in cost of post-flood recover efforts (\$ or %)	<ul style="list-style-type: none"> Should address whether urban area post-flood cost recovery improvements are redirected to rural areas where lost agricultural production and post-flood cleanup increase.
	4 Number of emergency preparedness and flood recovery plans, or % of populated areas with flood recovery plans	<ul style="list-style-type: none"> add: or % of populated areas with emergency preparedness plans
4. Wise Floodplain Management – Wisely manage floodplains protected by the SPFC to manage residual risks, particularly in areas of deep or rapid flooding		
a. Wise Floodplain Management	General	<ul style="list-style-type: none"> Replace this phrase with "to reduce" -- so you aren't managing "to manage." Agriculture is assumed to be a flood-compatible use, but agricultural managers state the use of flood easements, which may limit crop decisions, can decrease value of land which cannot be used for high value crops like orchards. These lands can also have delayed, or cancelled planting impacts from flooding during planting season, and will face post-flood cleanup.
	1 Total acres or % of floodplains with flood-compatible land uses preserved (through easements or other means)	<ul style="list-style-type: none"> Good Should include these economic considerations if it is to be effective.
	2 Number of land-use plans compatible with floodplain risks and functions	<ul style="list-style-type: none"> bad, per my general comment and the fact that 4.a.1) does a better job of addressing the same

	3 Number of nonstructural actions implemented within SPFC floodplains	<ul style="list-style-type: none"> This is one place where a "number of" metric might make sense, due to paucity of metrics here and the desire to encourage this approach. Nonstructural actions need to be defined in order to determine the usefulness of Metric 3).
5. Ecosystem Processes – Improve and enhance natural dynamic natural hydrologic and geomorphic processes		
a. Inundated Floodplain	General	<ul style="list-style-type: none"> Flow is missing as an ecosystem process. Reductions in flow, or alterations to flow regime could be considered a stressor, but it would be more logical to include flow as an ecosystem process with metrics for different aspects of the flow regime (floodplain inundation frequency, flow sufficient to provide passage, etc.) a general comment about 5a, 5b and 6a-6c. While these are okay as a starting point, we feel they will need more refinement to be of more use in planning and evaluating progress. Obviously not all acres or miles are of equal value in promoting species recovery. We hope to work with others to develop weightings for these metrics, or locations of highest priority for increasing these habitats. An increase in the amount of agricultural floodplain created is not equal to the same amount of increased natural or unmanaged floodplain created. The metric for increased floodplain should be more specific to include which type of floodplain that is increased. In general, this appropriateness of this metric will hinge on its definition. Defining is problematic due to the fact different processes occur during different types of floods and different seasons and durations -- and vary depending on the location in the landscape. Will likely need to pick 1-3 representative events (criteria), and even these will need to vary by location in the landscape.
	1 Total amount (acres, expected annual habitat (EAH) units) with sustained spring and 50 –percent frequently activated floodplain	<ul style="list-style-type: none"> Inundated floodplain is an effective metric for ecosystem processes. Sacramento River stakeholders are concerned that there is not a good understanding of how much has been created since restoration began in the late 1980's. Understanding the amount of restoration thus far will move that conversation forward.
	2 Total amount of expected annual inundated floodplain habitat (acres)	<ul style="list-style-type: none"> Need to account for conserved, sustainable existing cover, not just what projects create. Inundated floodplain is an effective metric for ecosystem processes. Sacramento River stakeholders are concerned that there is not a good understanding of how much has been created since restoration began in the late 1980's. Understanding the amount of restoration thus far will move that conversation forward.
b. Riverine Geomorphic Processes	General	<ul style="list-style-type: none"> a general comment about 5a, 5b and 6a-6c. While these are okay as a starting point, we feel they will need more refinement to be of more use in planning and evaluating progress. Obviously not all acres or miles are of equal value in promoting species recovery. We hope to work with others to develop weightings for these metrics, or locations of highest priority for increasing these habitats. Metric is needed: Measurement of meander over time, not just potential meander (similar to work done by Eric Larsen, UC Davis)
	2 River Meander Potential – total amount (acres)	<ul style="list-style-type: none"> Great concept, but definition/methodology will control whether or not this is appropriate/practical.

6. Habitats – Increase and improve quantity, diversity, quality, and connectivity of riverine aquatic and floodplain habitats		
a. Shaded Riparian Aquatic (SRA) Cover	General	<ul style="list-style-type: none"> Metrics should refer to the NMFS draft recovery plan on ideas as to where preference should be for SRA cover. It is important to note that not all miles are created equal. Throughout the document and in the metrics, there is a preference given to contiguous habitat. This is not appropriate in all cases. For example, it may be better to fill in a large 'gap' in the system as opposed to adding onto an existing area of habitat. a general comment about 5a, 5b and 6a-6c. While these are okay as a starting point, we feel they will need more refinement to be of more use in planning and evaluating progress. Obviously not all acres or miles are of equal value in promoting species recovery. We hope to work with others to develop weightings for these metrics, or locations of highest priority for increasing these habitats. Meaningful only if processes are in place to support natural recruitment.
	1 Shaded Riverine Aquatic Cover and Bank and Vegetation Attributes of SRA Cover – total length (miles)	<ul style="list-style-type: none"> Is a good metric for ecosystem processes. Sacramento River stakeholders are concerned that there is not a good understanding of how much has been created since restoration began in the late 1980's.
b. Riparian	General	<ul style="list-style-type: none"> a general comment about 5a, 5b and 6a-6c. While these are okay as a starting point, we feel they will need more refinement to be of more use in planning and evaluating progress. Obviously not all acres or miles are of equal value in promoting species recovery. We hope to work with others to develop weightings for these metrics, or locations of highest priority for increasing these habitats. Meaningful only if processes are in place to support natural recruitment. Metrics 1) and 2) are good measures of ecosystem processes. Sacramento River stakeholders are concerned that there is not a good understanding of how much has been created since restoration began in the late 1980's. Understanding the amount of restoration thus far will move that conversation forward.
c. Marsh	General	<ul style="list-style-type: none"> a general comment about 5a, 5b and 6a-6c. While these are okay as a starting point, we feel they will need more refinement to be of more use in planning and evaluating progress. Obviously not all acres or miles are of equal value in promoting species recovery. We hope to work with others to develop weightings for these metrics, or locations of highest priority for increasing these habitats. Define Meaningful only if processes are in place to support natural recruitment.
d. Floodplain Agriculture	General	<ul style="list-style-type: none"> An increase in the amount of agricultural floodplain created is not equal to the same amount of increased natural or unmanaged floodplain created. The metric for increased floodplain should be more specific to include which type of floodplain that is increased. Define Meaningful only if processes are in place to support natural recruitment.
	1 Habitat Amount – total amount (acres) of wildlife-friendly floodplain agriculture	<ul style="list-style-type: none"> This metric is difficult to assess without a definition of “wildlife-friendly” agriculture. There are concerns from stakeholders along the Sacramento River about the compatibility of wildlife and agriculture. Independent research about this issue could help resolve some of these conflicts.

8. Stressors – Reduce stressors related to the development and operation of the flood management system that negatively affect important species		
a. Revetment	General	<ul style="list-style-type: none"> • Revetment removal should occur in areas where process will help habitat.
	1 Revetment Removed to Increase Meander Potential and / or Natural Bank (without negatively affecting flood safety) – total length (miles)	<ul style="list-style-type: none"> • Revetment also protects critical infrastructure along the river and this function should be included in the discussion, not just flood protection.
b. Levees	General	<ul style="list-style-type: none"> • Using miles for setback levees is not a good metric. For example, a shorter setback in many cases is more beneficial than a longer one as if it is located correctly, could actually provide for more habitat and more of an increase in flood capacity. • New metric: Where levee relocation is implemented to increase capacity for protecting urban areas and reduces agricultural lands, the economic impacts of those costs to rural-agricultural areas should be addressed.
	1 Levees Relocated to Reconnect Floodplain or improved to Eliminate Hydraulic Constraints on Restoration (where consistent with flood risk management) – total length (miles)	<ul style="list-style-type: none"> • better to count as acres reconnected - better measure of benefit
	2 Miles and % of flood channel with adequate capacity to support riparian vegetation	<ul style="list-style-type: none"> • Not sure how you can define the threshold as to what will count.
c. Fish Passage Barriers	General	<ul style="list-style-type: none"> • Similar to 3a (2) (#of resiliency measures) using the objective as the measure has weaknesses. The objective is intended to meet some outcome, the outcome is what should be measured. In this case, perhaps miles of habitat re-connected. • Not all barriers need be reviewed to provide access, some can be retro-fitted with ladders or other fixes. • If a habitat based metric cannot be developed (and even if it is) some consideration of habitat quality, or the importance of the barrier relative to habitat should be included in the metric. In other words, not all barriers have equal impact, so they should not be weighed equally, in either planning or monitoring. Classification of barriers into priority groups would be possible (has been done- could be vetted). Likewise the quality and importance of habitat could also be classified (obviously this would be strongly correlated with priorities assigned to the barriers themselves). A combination of priorities for barriers and habitat would improve the metric. • Using fish passage barriers and diversions for metrics of stressors does not indicate much. Not all barriers and diversions are equal; some create or cause more take than others and some on a regular or annual basis. •
	1 Number of fish	<ul style="list-style-type: none"> • This is a number metric worth using, though benefits of barrier removal will vary by location. Just keeps it simple and

	passage barriers removed	undebatable.
d. Diversions	General	<ul style="list-style-type: none"> Similar to comment above on barriers, number is probably a poor metric. Number within a priority system that reflects the relative (or real) number of fish saved from entrainment, or amount of flow restored or the like would be superior. It would seem that miles of additional habitat belongs in 8c, vs 8d. Using fish passage barriers and diversions for metrics of stressors does not indicate much. Not all barriers and diversions are equal; some create or cause more take than others and some on a regular or annual basis.
	1 Number of diversions screened or removed	<ul style="list-style-type: none"> Could weight by max cfs diversion capacity.
	2 Miles of additional habitat accessible upstream	<ul style="list-style-type: none"> Seems like this belongs under 8c.
9. Long-term Cost of O&M – Reduce the long-term cost of SPFC O&M through more sustainable physical conditions and improved facility reliability		
a. Cost of O&M	General	<ul style="list-style-type: none"> Note: not addressed. Perhaps you could define and track O&M "events" to address this? If flooding is to be increased in rural-agricultural areas, then O&M metrics should address the costs of the agricultural landowners in cleaning up after floods.
	3 Reduction in ecosystem stressors or constraints (see also metrics under 8. Stressors)	<ul style="list-style-type: none"> ref to 8 is unclear - nothing there?
10. Consistent and Efficient O&M Practices – Develop SPFC maintenance practices that reduce costs, improve system performance, and promote ecosystem functions		
a. Efficiency and Consistency	General	<ul style="list-style-type: none"> note: not addressed
11. Collaboration and Regional Governance – Increase collaboration among flood managers, regulatory agencies, conservation planners, non-governmental organizations, agricultural and other interests		
a. Collaboration and Governance	General	<ul style="list-style-type: none"> How will the needs for regional projects identified by the Regional Flood Management Groups be incorporated in to the Basin-wide feasibility studies which are already in process? Agricultural stakeholders along the Sacramento River have issues with restoration and its impacts on continued ag operations. Understanding and addressing their issues would be an effective collaboration metric. It would require identifying the issues and tracking over time how they are addressed.
12. Sustainable Funding – Improve the long-term sustainability of flood management funding		
a. Funding	General	<ul style="list-style-type: none"> If costs for urban flood protection are redirected to rural-agricultural areas through lost agricultural production and direct costs from flood events, funding mechanisms should address those costs.
14. Project Approvals – Improve the efficiency of project implementation (time and cost of approvals), and success of conservation and mitigation		

a. Permit Costs	General	<ul style="list-style-type: none"> Reducing mitigation requirement costs and reducing permitting processes can be achieved by front loading projects with ecosystem restoration components. This will allow for the project applicant to incorporate their own ideas for ecosystem improvements. Front loading will also help expedite the project permitting because if enough mitigation is already incorporated, this will eliminate the need to stop the permitting process and in order to engage in 'negotiations' with the applicant to incorporate more habitat improvements in order to offset project impacts. note: not addressed -- and not appropriate here
b. Efficiency	General	<ul style="list-style-type: none"> An increase in acreage per permit mechanism is a poor metric. It is often the details of a various region that can create permitting challenges, and this has little to do with size of the area. Reducing mitigation requirement costs and reducing permitting processes can be achieved by front loading projects with ecosystem restoration components. This will allow for the project applicant to incorporate their own ideas for ecosystem improvements. Front loading will also help expedite the project permitting because if enough mitigation is already incorporated, this will eliminate the need to stop the permitting process and in order to engage in 'negotiations' with the applicant to incorporate more habitat improvements in order to offset project impacts.
	1 Reduced time to acquire permits (days / project, average or % reduction in average time for approvals)	<ul style="list-style-type: none"> Permitting time, regional/consolidated permits and advance mitigation area good metrics and can be advanced by corridor management planning
15. Integrated Water Management – Promote design of multi-benefit projects that integrate other resource needs (ecosystem, water supply, recreation, etc.), where feasible		
a. Multi-benefit Projects	General	<ul style="list-style-type: none"> Funding multi-benefit projects is a good approach but ecosystem improvements should be a requirement and incorporated into every project. Since the environmental baseline will need to be maintained or improved if ecological improvements are not already built into the project descriptions adding an additional cost component to each project. Multi-benefit should be defined as it can mean different things to different people.
	3 Number of projects that integrate and/or complement the integrated water management objectives of other projects / programs	<ul style="list-style-type: none"> Strikes me as very challenging to define clearly.